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Adoption of Peer-To-Peer Assessment in a Computing Skills Course

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Abstract: The process of peer-to-peer assessment brings great benefits to the teaching & learning process. This paper presents a peer assessment model which was applied to students enrolled in a generic computing skills course. In order to measure the effectiveness of this proposed model, students had to evaluate their colleagues based on predefined criteria and a comparison is presented between the lecturer assessments and the peer assessments. The peer assessment model was evaluated and the results presented demonstrate that the peer assessment model is a successful process to be adopted in teaching generic skills.

Key words: Peer-to-Peer assessment; Group project; Student perception

INTRODUCTION

Peer assessment is the process of assessment of students by other students, both formative reviews to provide feedback and summative grading. Peer assessment is one form of innovative assessment, which aims to improve the quality of learning and empower learners, where traditional forms can by-pass learners' needs. It can include student involvement not only in the final judgments made of student work but also in the prior setting of criteria and the selection of evidence of achievement^[2,16]. Peer assessment can likewise be both formative and summative, and can be a useful way of enabling students to think critically about their own work. For peer assessment it is essential to develop clear guidelines about giving feedback to others.

Peer to peer assessment is a major issue in many universities and it is widely applied in some^[7]. If organized, delivered and monitored with care, peer assessment can yield gains in the cognitive, social, affective, transferable skills and systematic domains that are at least as good as those from staff assessment^[3,17]. A range of studies has contested the value of assessment in general, in particular teacher-only assessment. Teacher-only assessment limits the opportunity for individual evaluation skills and the opportunity for students to understand the educational objectives and how these relate to the educational experiences. Teacher-only assessment restricts students from taking responsibility for their own learning.

Students need to gain awareness of their own learning strategies in the light of the educational objectives. The assessment process needs to be a

learning tool. Ideally assessment is intended to help students plan their learning, identify their strengths and weaknesses and develop transferable skills.

The implementation of peer assessment, an alternative way of assessment for teachers, received much attention in recent years due to its effectiveness for students' learning^[1,9,18,6,8]. This new assessment and learning strategy has been used extensively in diverse fields^[5,6,8]. In addition to helping students plan their own learning, identify their own strengths and weaknesses, target areas for remedial action, develop meta-cognitive and professional transferable skills, and enhance their reflective thinking and problem solving abilities during the learning experience^[11,12]. Peer assessment is also found to increase students' interpersonal relationships in the classroom^[10].

Peer assessment has been used extensively in many different fields, such as writing composition, business, science, electrical engineering, medicine, information and social science. While reviewing the past studies of peer assessment, Topping (1998) found it to be a reliable and valid method for assessment and teaching. The peer assessment scheme has been modelled after the authentic journal publication process of an academic society. In the process, the editors of the journal provided the authors with anonymous comments and suggestions for further modification, thus making the papers more mature^[13,14,15].

A continuing challenge for educators using group work is to ensure that it is a positive learning experience for students. Group work is an important teaching strategy within the Generic Computing Skills and Professional Issues course curriculum as it can

facilitate both knowledge gaining and the development of teamwork skills, which are essential for the professional practitioner. Students often enjoy working in a group and they value learning from and with other people. However, problems can arise when group work is assessed and the same mark is awarded to individual students irrespective of their contribution to the group work.

The problem of 'free-riders' within group work is well recognized and educators need to consider the impact this has on student's attitude to group work. Students view group work assessment as unfair if there is equal reward for unequal contributions. These negative experiences can lead to students feeling discontent and dissatisfied with group work and result in students resenting further group work when the assessment system is perceived as unfair and inequitable. Therefore, the challenge for educators is to develop new systems of assessment that are recognized and accepted by students as ensuring equality in group work assessment. Hand over control of the assessment process may be difficult for many teachers, but sees it as important if 'academic and professional conformity' is to be avoided^[4].

The Peer Assessment Model: The Generic skills and professional ethics course consists of a number of topics: ethics, research methods, technical report writing, presentations skills, CV writing & interviewing skills. In order to get realistic and beneficial results only the presentation skills part of the course was applied. The peer assessment model adopted for students enrolled in the Generic Computing Skills and Professional Issues course was concerned about grading their colleagues when presenting multiple topics. As the introduction of the group project was a new risk, students needed to be monitored and evaluated on a continuous basis by the course instructor. The project to be assessed by students was evaluating other student's presentations skills. Many aspects were taken into consideration, such as:

- Presentation skills which focused on (Voice projection, Eye contact, Confidence, Time keeping, Generating interest, Level of improvement., Clarity of presentation tool provided by the student during his/her presentation).
- Cooperation techniques (Listening to each other, Helping the group address individual differences, Attending meetings and completing tasks on time).

The criteria that require a careful examination of the work in question is likely to provide valuable peer feedback, rather than reliance on judgment based

personal reactions. The assessment criteria for the peer assessment model were carefully reviewed and confidential to eliminate personal opinions as much as possible so each student in the group evaluates every other member of the group by answering 13 questions that were developed by the course instructor. The results of those assessment questions form a part of this paper where students evaluated other members in the group and gave an overall average of the presentation skills that were later compared with the instructor's marking. At the completion of the project, all 26 students enrolled in the course were asked to complete a questionnaire consisting of 7 questions about the peer assessment process and 10 questionnaires were returned as a response.

RESULTS AND DISCUSSION

The generic computing skills and professional issues course covered a number of topics: ethics, research skills, technical report writing skills, presentation skills, preparing tenders "ations. All topics received between one and two weeks of lectures and an assignment for each topic. The presentation skills covered issues such as preparing power points slides on the research topic assignment covered in the research skills section of the course. Each student was given an opportunity to practice before his peers once and before the lecturer once which meant that each student gave two practice presentations and sat through all other presentations. The lecturer gave feedback to every student about his/her seminar and these comments or criticisms were done in front of all other students. This way every one of the students benefited equally from these practice sessions so that when the for-real judgements were made by the peers and the lecturer, all had to compete seriously and put their full effort in trying to score as high a grade as possible.

The concept of peer-to-peer assessment was explained to the students and blind marking was a way of avoiding copycats and personal issues. A total of thirteen issues relating to presentation skills were very clear to all peers and the grading scheme was given by the lecturer.

After evaluating their colleagues in the peer assessment model the students reached very high results that are shown in Fig. 1. Further, the average peer assessment was given a real weighting in the final marks of the students which made the process a bit more serious for the students. A weighting of 20% was allocated to peer-to-peer assessment.

The criteria provided by the course instructor were taken into consideration during the evaluation process.

In order to show the results in a summative way, we show the overall average of the presentation skills from the student's perspective that were later compared to the lecturer marking (Fig. 2) to test the reliability of peer assessment. Here is the summary of the results:

1. Clarity of slides (font, colour, graphics, etc.): Students gave a score of 9.94 out of 10 to the slides clarity due to the student's effort to show their presentation skills improvement. Students organized their topics points to be discussed in a way that delivers the information through meaningful graphics, graphs, tables, etc.
2. Distribution of contents of slides: A score of 9.76 was given to the way the slides content were distributed. The students aimed to adapt a structured and systematic way to present their topics in the best way, thus focusing on giving a brief introduction, some facts, results and conclusions.
3. Flow of presentation: This topic scored a 9.44 out of 10. Presentations had very logical flow where the student talked about each topic and moved to the next in a smooth way.
4. Voice projection: Overall average of student's voice projection is 9.4. This skill improved all the way through multiple trainings and group work, where the student got used to the audience and tried to catch their attention by changing the pace and tone of their voice.
5. Eye contact and attention to the participants: 9.06 is the score for this topic. Students built self confidence through presentations training. Therefore, it was obvious that students were confident to face the audience and make eye contact and keep their attention.
6. Presenter confidence in topic presented: 9.29 is the score for the presenters confidence in the topic presented. Due to the enhancement of searching, scanning and skimming skills, students were very confident about their topics, not forgetting the feedbacks by the course instructor.
7. Level of interest expressed by presenter: Students scored 9.13 for this topic where they tried to show their interest in the topics they presented and show the audience their point of view in the topic.
8. Time keeping, Students kept their presentation in the time frame specified and this scored 9.74 out of 10.
9. Beginning and finishing presentation: 9.36 was given as a score for this topic. Students had a good beginning and ending when they presented their topics.

10. Presenter generated interest in topic presented: Students had generated a very high interest in other students. This is indicated by the score of 9. Students gained new skills like changing the tone of their voice, keeping eye contact with others, focusing on certain points to show details specifically, etc.
11. Presenter kept your attention during presentation: Students gave a score of 9.05 for the presenter who tries to keep the audience attention.
12. Level of improvement in presentation skill since beginning of course: 9.52 was the score for this topic. Students gained new skills and therefore improved their presentation skills and even developed new skills to follow themselves and other members of the group.
13. Confidence by presenter throughout presentation: 9.34 is the score for the overall presenters confidence throughout their presentation. Students had developed high confidence in standing in front of an audience and trying to persuade them about the topic they present.

The lecturer marking is shown in Fig. 2 and it indicates that the lecturer also had high results for the presentation skills. The results of the peer assessment model marking were compared with the lecturer marking results as shown in Fig. 3.

The lecturer can indicate from Fig. 3 that most of students marked their colleagues on reasonable basis which is nearly similar to the lecturer marking. By this, the lecturer can adapt the peer assessment technique because it stands on good basis and students tend to experience more when marking themselves.

Students in their evaluation of the peer assessment model were asked to complete a questionnaire to get their opinion of the peer assessment method. Results from this study, detailed in Fig. 4, indicate that (50%)

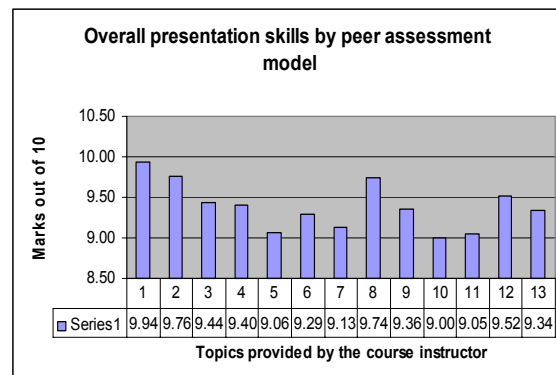


Fig. 1: Presentation Skills Test (Peer model marking)

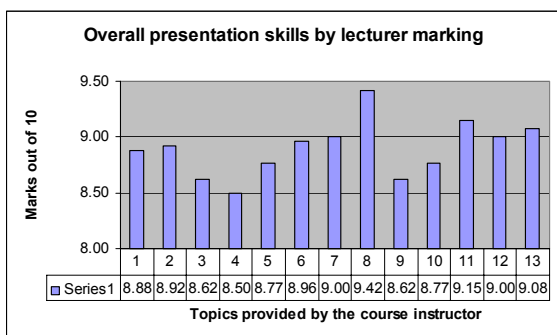


Fig. 2: Presentation Skills Test (Lecturer marking)

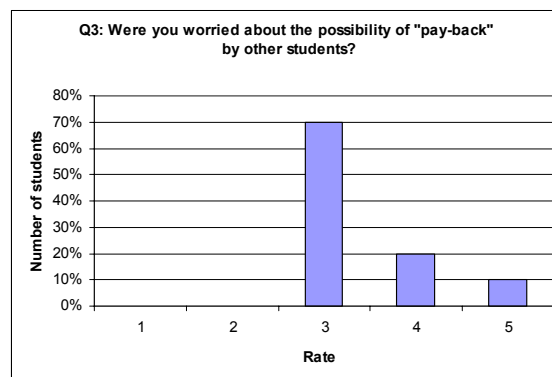


Fig. 6: Possibility of "pay-back"

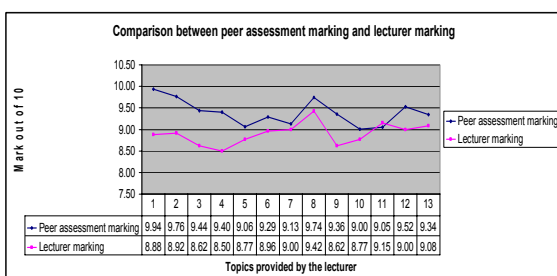


Fig. 3: Comparison of results (peers & lecturer)

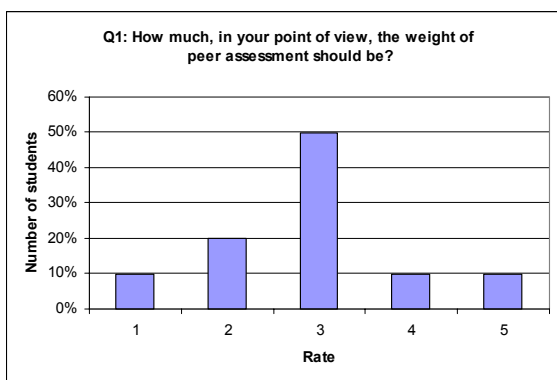


Fig. 4: Peer assessment weight

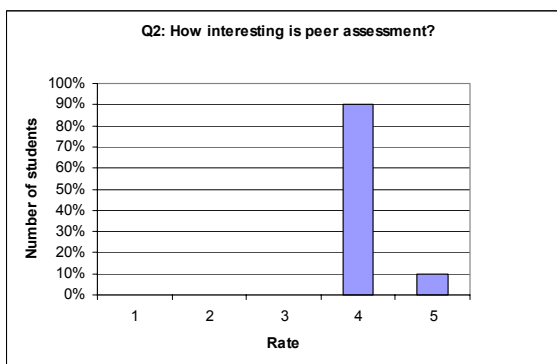


Fig. 5: Interest in peer assessment

of the students involved in the peer assessment model agreed that the weight of peer assessment should be 30%. This maybe due to the fact that peer assessment enhances the participation of group members in cooperative work and that students regarded the exercise as effective for learning and group work. It is also important that students understand the assessment criteria that they are being asked to apply. This is very interesting since it indicates that students have trust in being assessed by their peers.

According to the results from Fig. 5, (90%) of students involved in the peer assessment model gave high interest level in peer assessment while (10%) gave the highest rate for this type of assessment. There was a high correlation between the members of the groups that found the peer assessment process an enjoyable clear learning experience. This proves that final year university students have learnt to take responsibility and are ready to take decisions. Further, it indicates that students began to appreciate the role played by the lecturer in the assessment process.

Students in this study were asked if they were worried about the possibility of pay-back by other students. A total of (70%) of the students agreed on an average level that they were partially worried about the possibility of pay-back. Only (30%) of the students were really worried about the possibility of payback by other students. Fig. 6 indicates their responses about the possibility of pay-back. All students felt they put time and effort into their assessments and therefore they were not all that worried about the possibility of pay-back.

One of the key issues to arise during the development of a peer assessment model was the value of this assessment model against the traditional "lecturer-only" assessment. Students were asked if they would prefer the peer assessment model for marking their work rather than the lecturer. In Fig. 7 almost (60%) wanted the peer assessment model to mark their work while (20%) preferred the lecturer marking. Although a range of studies have questioned the reliability of students' perceptions about peer assessment and that it may lead to lose quality in the

marking, students found the process to be fair, valuable, enjoyable and helpful in developing, transferable skills in research and communication and by this students had enriched their experience.

When asking students about their agreement on such a method, in Fig. 8 we can conclude that (60%) of students replied with a high agreement. Students noted the fairness of this model and the opportunities for learning afforded by having to actually apply the assessment criteria on other students.

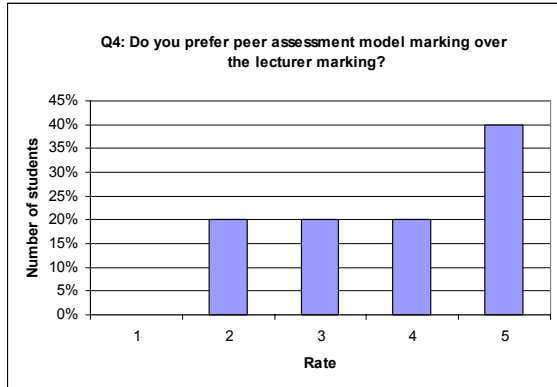


Fig. 7: Peer assessment preference over lecturer marking

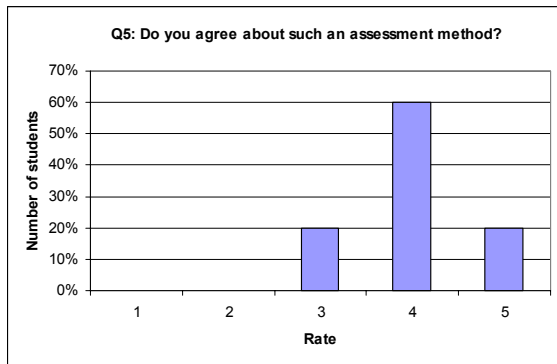


Fig. 8: Students agreement about peer assessment

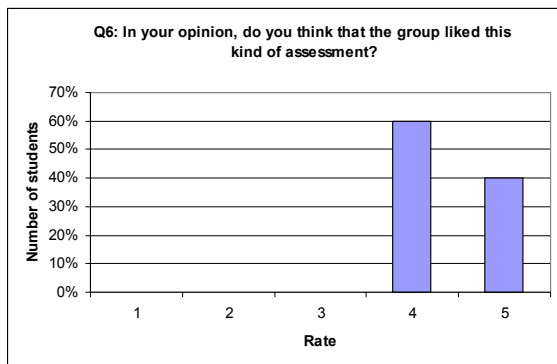


Fig. 9: Student preference of this method

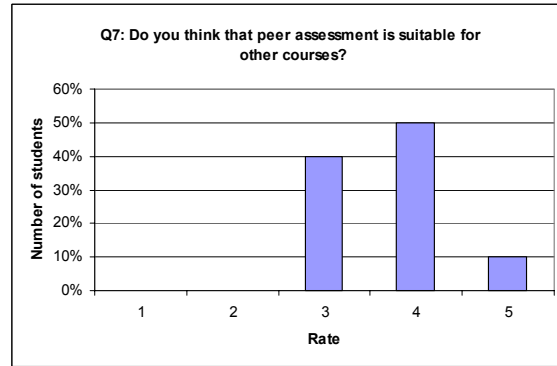


Fig. 10: Using peer assessment for other courses

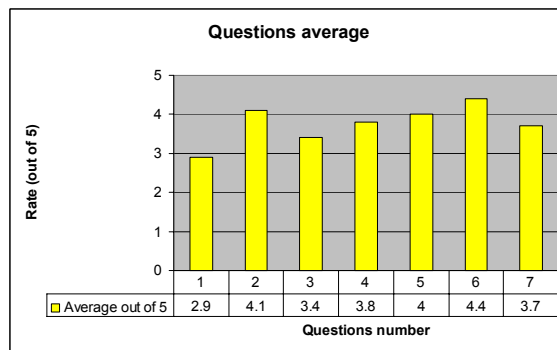


Fig. 11: Overall questionnaire analysis

When asked if they liked this type of assessment, students were very positive. This can be seen in Fig. 9 where 80% agreed to a high extent and 20% agreed to a very high extent. This indicates that students had a good experience as a result of this process and that confidence and integrity can be developed and taught.

When students were asked whether they think that this kind of assessment is suitable for other courses in computer science, (50%) replied with high agreement. Students have gained knowledge from this work and it was a great learning style for students that may really help in other courses. This is shown in Fig. 10 above. Peer assessment may not be ideal for some courses in computer science, but it certainly can be put to the test for course projects and assignments.

In Fig. 11, the overall questionnaire average is shown and each of the questions is given a mark out of 5. The results of this questionnaire are intended to feedback into a later stage of development of the peer assessment model in the Generic Computing Skills and Professional Issues course and to elaborate the model to assess the teamwork process.

CONCLUSION

Peer assessment models provided a challenge and one of the key challenges was to adapt a new assessment method for a new course in the department

of computer science at the University of Bahrain. This success of the peer assessment method was based upon the following findings. Students felt they learnt a great deal throughout the assessment process. Students felt that peer assessment should be given a reasonable weight. (2.9/5.0). Students enjoyed assessing the work of their peers (4.2/5.0). An average number of students were worried about the possibility of pay-back ratings by their peers (3.4/5.0). A significant proportion (3.8/5.0) of students preferred this type of assessment to "lecturer only" assessment. A number of cautions must be made. First, the sample of Generic Computing Skills and Professional Issues students was quite small and focused. Second, the results record only the students' perception at the time of the study. As a result of students feedback the peer assessment method scored a rate of (3.75) out of (5) and this may help other courses in the University to benefit from the peer assessment method and improve assessment and teaching within the faculty.

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